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EXAMINER

KOSACK, JOSEPH R

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



### **DETAILED ACTION**

Claims 27-43 are pending in the instant application.

#### ***Amendments***

The amendment filed on January 5, 2009 has been acknowledged and has been entered into the application file.

#### ***Previous Claim Rejections - 35 USC § 112***

Claims 11-26 were previously rejected for providing for the use of an ionic liquid, but, since the claim does not set forth any steps involved in the method/process, it was unclear what method/process applicant is intending to encompass.

The new claims have corrected the issues, and the rejection is withdrawn.

#### ***Previous Claim Rejections - 35 USC § 101***

Claims 11-26 were previously rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101.

The new claims have corrected the issues, and the rejection is withdrawn.

#### ***Previous Claim Rejections - 35 USC § 103***

Claims 11-26 were previously rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (*Proceedings of Solar Forum 2001*) in view of Vogl (USPN 4,657,741).

The Applicant has traversed the rejection on the grounds that the Examiner has not provided proper motivation to select the references, that the prior art does not teach

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the desirability of the change, that the *prima facie* case is a hindsight reconstruction, that the solar heat transfer medium never requires cooling, that ionic liquids cost significantly more, and that the ionic liquid medium is significantly more efficient than traditional salt melt media.

The Examiner is not persuaded. Firstly, the superior properties of ionic liquids as heat transfer media are taught by Wu et al. as set forth in the previous action. Even though the Applicant may believe that a solar heat transfer medium is constantly heating and is never cooled, a solar heat transfer medium cools down in the nighttime when the sun is not shining on the solar cells. Additionally, Wu et al. specifically state, as cited in the previous action, that ionic liquids can replace thermal oils and molten salts as heat transfer media. Therefore, Wu et al. specifically suggest the change from a molten salt to an ionic liquid as a heat transfer medium.

Vogl teaches a basic reactor in which the ionic liquid heat transfer medium as taught by Wu et al. can be used in. The Applicant believes that the references are from two different art areas, but the Examiner believes that they are within the same art area as they both deal with heat transfer media. All the Applicant has done was confirm what Wu et al. taught in 2001 that ionic liquids can replace thermal oils and molten salts as heat transfer media.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was

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within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Therefore, the Applicant's arguments have been considered, but were not found to be persuasive. The rejection is maintained.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 27-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (*Proceedings of Solar Forum 2001*) in view of Vogl (USPN 4,657,741).

The instant claims are drawn to a method of using an ionic liquid as a heat transfer medium for the indirect introduction of heat into or from a reactor. Dependent claims detail properties of the ionic liquid such as having a melting point below 25° C, the type of cation in the ionic liquid, and the type of reaction to be performed in the reactor.

Wu et al. detail the use of ionic liquids as a heat transfer medium for solar cells. Wu et al. specifically state that the liquid range of one ionic liquid with imidazolium as a cation is -75 -416° C, with a higher thermal capacity, maximum applicable temperature, and storage density than thermal oil. See Table 2 on page 5 of the document. Additionally, Wu et al. specifically state that there is a possibility that current thermal transfer fluid and storage media such as molten salts and thermal oils can be replaced with ionic liquids. See page 6 of the document, first paragraph.

Wu et al. do not specifically show the use of ionic liquids as the heat transfer medium in a reactor, specifically for an exothermic reaction such as a partial oxidation or the preparation of chlorine by oxidation of hydrogen chloride.

Vogl teaches a tube and shell reactor where a heat transfer medium separates the reaction tube from the shell of the reactor meant for either an endothermic or

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exothermic reaction. See column 3, lines 4-38 and Figure 1. Even though Vogl does not teach an oxidation reaction occurring in the reactor, it would be obvious to one of ordinary skill that an oxidation can occur in the reactor as it is an exothermic reaction.

Therefore, one of ordinary skill in the art would be able to take the reactor of Vogl and replace the heat transfer medium with an ionic liquid to generate the instant invention with a reasonable expectation of success. The motivation to do so comes from the superior properties that ionic liquids have over other heat transfer materials as taught above by Wu et al.

### ***Conclusion***

Claims 27-43 are rejected.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph R. Kosack whose telephone number is (571)272-5575. The examiner can normally be reached on M-Th 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on (571)-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph R Kosack/  
Examiner, Art Unit 1626

/REI-TSANG SHIAO /  
Primary Examiner, Art Unit 1626